Verification Services and Financial Reporting Quality: Assessing the Potential of Review Procedures

Abstract

Are financial statement reviews, which are limited to primarily analytical procedures and inquiries, a cost-effective verification service for some firms? The answer is important for owner/managers considering reviews as well as investor/lenders, regulators, and those interested in effective verification mechanism design. Using data from U.S. private companies choosing to have financial statements compiled, reviewed, or audited, we calculate four model-based financial reporting quality proxies and, to reflect broader economics, the cost of debt and verification fee estimates. Consistent with application of prescribed verification procedures, we find both reviews and audits yield significantly better reporting quality scores and lower cost of debt than zero-verification compilations. However, model-based reporting quality scores of reviews and audits are indistinguishable statistically, on average. Regarding broader economics, we find that relative to compilations, reviews yield more than half the added interest rate benefit associated with an audit, at considerably less than half the added cost. Overall, our results suggest reviews may provide a cost-effective verification alternative to audits, and the potential of analytical procedures warrants more attention by audit researchers and regulators.

Keywords: economics of verification, financial reporting quality, cost of debt, crowdfunding, confirmatory data analytics.
JEL Classification: G21, M41, M42, M48

1. Introduction

Extant financial reporting audit mandates suggest that regulators around the world view the aggregate market benefits of an independent financial statement audit as outweighing its cost, while many companies perceive little external benefits associated with an audit (Minnis and Shroff 2017). The U.K. and other European countries that mandate statutory audits for private companies have also questioned the value-added and have raised the minimum entity size at which such audits are mandated (IAASB 2011, Gov.UK 2016).[1] In response to this decline in private company audit mandates, the International Auditing and Assurance Standards Board (IAASB) recently enhanced standards for "limited verification" reviews to help smaller CPA firms provide intermediate verification benefits at lower cost (IAASB 2012).

U.S. private firms' choice of verification (assurance) level for GAAP-based annual financial statements is receiving broad attention.[2] For example, in a 2011 report to the Financial Accounting Foundation (FAF), members of the "Blue Ribbon Panel" (FAF 2011) stated "[m]any Panel members believe that within the U.S. marketplace, significant, unnecessary cost is being incurred for GAAP financial statement preparation and audit, review, or compilation services." Because U.S. private companies can choose whether to issue and to obtain independent verification of GAAP-based financial statements, each firm's choice will reflect its individual cost-benefit tradeoff (Dedman et al. 2014). A recent working paper reports that almost two-thirds of medium to large private firms studied do not produce audited GAAP-based financial statements (Lisowsky and Minnis 2018).

In the U.S., the Sarbanes-Oxley Act of 2002 mandates annual audits of U.S. public company financial statements and internal controls over financial reporting as well as reviews of

[1] Vanstraelen and Schelleman (2017) provides a review of the costs and benefits of private company audits.
[2] To focus on the procedural basis for assurance and related services, we will use the term "verification" level.

quarterly financial statements. However, under the Jumpstart Our Business Startups (JOBS) Act of 2012, the U.S. Securities and Exchange Commission (SEC) recently allowed some smaller public issuers raising funds via crowdfunding to choose an independent review, a compilation, or to even to "go bare" with zero accounting or auditing services by a CPA firm (SEC 2016). Thus, U.S., U.K., and other European regulators believe reviews may be an acceptable alternative to mandated audits for smaller entities, but there is little empirical evidence on the relative benefits and costs of review-level verification services.

There are several independent verification services available to private companies, which results in a wide range of verification procedures that may be applied by the CPA firm. Compilations require reading the financial statements for a GAAP format, but zero verification procedures and the CPA firm states that no "assurance of any form" is provided. Reviews are limited to primarily analytical procedures and inquiries of management as verification to express "limited assurance." Audits apply analytical procedures and inquiries, but also require evaluation of internal controls over financial reporting as a basis for risk assessment and require verification of financial details as necessary to achieve "high but not absolute assurance" about possible material misstatement in audited statements.

Despite the substantial difference in verification inputs, there is little empirical evidence on the resulting incremental benefits and costs across alternative GAAP-based financial statement verification services available or potentially available to public *or* private firms. We provide evidence using non-public data from two sources: A large sample of U.S. private company financial statement data applying U.S. GAAP from Sageworks, and a sample of compilation, review, and audit fees from a medium-sized U.S. CPA firm.[3]

[3] Sageworks provides the accounting method used by each company with "accrual-based" indicating U.S. GAAP, along with "cash-based," or "unknown." We exclude all "cash-based" observations and conduct tests combining

As to verification effectiveness, there is no single definition or readily observable metric for evaluating reporting quality across various verification services for private companies in the U.S. The SEC, American Institute of Certified Public Accountants (AICPA), Public Company Accounting Standards Board (PCAOB), and International Forum of Independent Audit Regulators (IFIAR) do not define financial reporting quality overall or verification quality as a component part, and PCAOB and IFIAR inspections of public company audit firms do not determine whether financial amounts are misstated (IFIAR 2018). Restatements of previously issued audited financial statements and lack of appropriate going concern audit references are possible quality indicators for public U.S. companies, but neither is available for private companies.

In contrast, the CFA Institute Glossary does define "financial reporting quality" as "[t]he accuracy with which a company's reported financials reflect its operating performance and their usefulness for forecasting future cash flows." There is evidence that private firms' audited annual financial statements are more useful those not audited, for example, using a sample of U.S. private firms, Minnis (2011) finds that cash flow predictability is higher for audited firms. In addition, for a large sample of U.K. private firms, Clatworthy and Peel (2013) find audited financial statements are about half as likely to be subsequently "amended" for accounting errors as non-audited financial statements. Unfortunately, there is no counterpart to "amended" financial statements available for private companies in the U.S. Also, "restatements" for correction of materially misstated financial statements as exist for U.S. public companies are not available for U.S. private companies.

"accrual-based" with "unknown" observations. As a robustness test, we use only the "accrual-based" observations and our results are unchanged.

Thus, for private U.S. firms, there is no authoritative definition financial reporting quality and no publicly available common indicators of poor accounting due to accounting misstates and lack of going concern warnings. In this conceptual and publicly available data void, we conduct types of tests of verification service benefits using observable information.

One test type is model-based, where each model uses *only* a firm's financial statement amounts to provide a basis or proxy for assessing the "quality" of annual financial reporting. Specifically, we calculate four common model-based financial reporting quality proxies (denoted FRQPs) that apply a mathematical formula to reflect the likelihood of accounting misstatement. In particular, we calculate FRQP scores based on: (1) Benford's Law (e.g., Durtschi et al. 2004; Amiram et al. 2015); (2) an accounting-fundamentals-based "fraud score" (Dechow et al. 2011); (3) unsigned abnormal accruals (e.g., Aobdia et al. 2015); (4) signed abnormal accruals (e.g., Jones 1991; Collins et al. 2017), where a lower FRQP score indicates *higher* quality financial reporting.

The other test type relates two economics-based measures. First, we use cost of debt as a more comprehensive measure of verification service benefits resulting from the complex financial reporting environment. As an example, cost of debt may reflect lenders' inferences from a firm's verification service choice about the firm's managerial integrity, future prospects, and better accounting records.[4] Second, as a measure of verification service costs, we use a large sample of CPA firm service fees to estimate the verification fee for each firm in our sample.

We find that model-based FRQP scores are generally lower for higher verification levels (indicating higher quality). The biggest FRQP difference is between compilation and review, with a relatively modest difference between review and audit. In particular, for our overall sample,

[4] Moreover, prior studies have viewed lower cost of debt as a key benefit of higher verification levels, and as an indicator of lender-perceived quality of financial statements (e.g., Bandyopadhyay and Francis 1995; Blackwell et al. 1998; Minnis 2011; Defond and Zhang 2014).

FRQP scores for reviews are statistically indistinguishable from audits. These full-sample results could be due to (a) financial reporting quality being on-average subject to rapidly diminishing marginal returns to CPA firm effort once analytical procedures and inquiry (i.e., review procedures) are applied, or (b) an inability of our FRQPs to detect the substantial verification input differences between reviews and audits (although our FRQPs detect input differences between compilation and review).[5]

Regarding our economics-based measures, we use the subset of our private firms with outstanding debt and find that cost of debt for audited firms (reviewed firms) is 115 to 149 basis points (66 to 120 basis points) lower than compiled firms, where the cost of debt for audited firms is statistically significantly lower than for reviewed firms.[6] As a comparison, Bandyopadhyay and Francis (1995) finds a 28 and 25 basis point difference (between compilation and reviews, and reviews and audits, respectively). As discussed below, they also find the *likelihood of receiving a loan* is substantially increased with audited financial statements. Thus, cost of debt relates and trades off multiple complex factors, and isolation of verification effects per se is difficult.

Neither Sageworks nor regulators provide CPA firm fee data to allow assessment of net benefits of verification services. In this void, we obtain compilation, review, and audit fee data from a middle-market accounting firm for a sample of their clients (comparable in size to our sample firms) to estimate implied fees for each observation in our cost of debt subsample. We find that the cost of compilation, review, and audit for the average-sized sample firm is approximately $7,368, $15,120, and $27,726, respectively. Combining these estimates with our cost of debt

[5] To explore whether model-based audit benefits arise in some settings, we also examine sample partitions where it is more likely that incremental audit procedures will reveal misstatement of details.

[6] Our evidence that reviewed financial statements are associated with lower cost of debt than compiled financial statements contrasts with findings in both Blackwell et al. (1998) and Minnis (2011), who note that they find no difference in cost of debt between reviews and compilations.

analysis suggests that, relative to compilation, reviews yield between 55% and 80% of the cost of debt benefits associated with an audit, but only 38% of the added fees.

Both our model-based FRQPs and economics-based cost of debt and fee measures may reflect the service level as well as the complex underlying basis for *selecting* the service level, including knowledge of a firm's pre-verification financial reporting quality. For example, firms with good internal controls and favorable prospects may choose to have financial statements audited, consistent with the bonding hypothesis (Watts and Zimmerman 1986). We attempt to address endogeneity concerns by estimating propensity-score-weighted regressions, which is useful for studies with multiple treatments (Guo and Fraser 2015) and will help control for selection effects involving four levels of verification.[7] Further, because time-invariant firm characteristics may be correlated with verification levels and FRQPs, we conduct an exploratory verification changes analysis and find evidence that provides support for our levels analysis.

Overall, our study documents how verification levels across the entire CPA firm service spectrum are associated with output-based proxies for financial reporting quality, as well as an exploration of the broader economics of verification choice via a cost of debt analysis. We find reviews are associated with significantly better FRQPs than are compilations, and provide novel evidence that reviews and audits are associated with similar FRQPs, even though verification effort for audits is much greater. We find cost of debt differences consistent with market recognition of incremental reliability of financial statements among and between audits, reviews, and compilations and provide evidence that reviews may be a cost effective verification alternative, particularly for relatively small public entities.

[7] Inferences from propensity-score-weighted regression are potentially threatened by selection on unobservable factors (Shipman et al. 2017).

Our results have implications for audit or review mandates, as well as the value of accounting expert compilation of financial statements using a mandated financial reporting framework. Our verification procedure analyses also provide a benchmark to evaluate the role of confirmatory data analytics (related to analytical procedures) in standards for both audits and reviews, as well as the precision and economics of the audit, review, and compilation markets.

The remainder of this study proceeds as follows. Section 2 discusses technical details of the various levels of financial statement verification that motivate our tests. Section 3 describes our research design and Section 4 outlines our data, sample selection, and descriptive statistics. Section 5 presents our empirical analyses, and Section 6 concludes.

2. Background and Motivation

2.1. Verification services for private firms

To meet market demand for high-quality independent verification services that fall outside SEC mandates, the AICPA has established *Statements on Auditing Standards* and *Statements on Standards for Accounting and Review Services* (SAARS).[8] These standards provide guidance and a floor on input quality expected for each service by AICPA members, and also provide a basis for their clients and third-party users of financial information to differentiate reliability of financial statements by service level.[9] All three services (i.e., audit, review, compilation) result in a CPA firm report and require accounting expertise, but differ substantially as to verification procedures required, the form of assurance given, and whether the CPA firm must be independent (e.g., not hold equity in the client).

[8] The SEC has effectively made relevant SSARS No. 21 review standards in implementing its rules under Regulation CF (under provisions of the JOBS Act of 2012), which permits issuers of public securities via crowdfunding to provide reviewed (or less than reviewed), rather than audited, financial statements for certain levels of capital raising.
[9] SAARS No. 21 summarizes review, compilation, and preparation assistance standards. Unfortunately, preparation services do not result in a CPA firm report and cannot be tracked on a systematic basis via Sageworks or otherwise.

As summarized in Appendix A, CPAs conducting private company *audits* are required to evaluate the company's risks of material misstatements based on understanding its industry, accounting practices, and internal controls; to evaluate relationships among and between recorded balances and other summary information using analytical procedures and inquiries of client management regarding any unexpected recorded results; and to selectively verify account balance details as necessary. This work effort is intended to provide "high, but not absolute" assurance that the statements are free of material misstatement. The auditor must also be independent and express a positive conclusion that "*in our opinion*," the financial statements are fairly presented and properly apply GAAP.

Reviews require CPA firm independence and a basic understanding of the client's industry and accounting, and like an audit, must apply "top down" analytical procedures to resulting account balances and make inquiries of management regarding any unexpected relations among the balances. However, the reviewer CPA does not evaluate internal control or conduct any verification or substantiation procedures regarding particular account balances or details. If results of top-down analytical procedures applied to financial statements are reasonably in line with expectations based on the CPA's expertise, or any matters that seem out of line have been resolved by explanations from management, then the reviewer's verification is finished. The review is intended to allow "limited (or 'moderate') assurance" and is to be expressed in negative form as: "Based on our review, we are *not aware* of any material modifications needed to make the financial statements comply with GAAP in all material respects" (emphasis added).

In a *compilation*, the CPA firm helps assemble data for GAAP-based financial statements, but provides no verification-related work. Rather, the CPA just "reads the financial statements in light of the stated financial reporting framework (e.g., GAAP) and considers whether the financial

statements are in the proper form and free from obvious material misstatement" (AICPA 2017). Also, the compiler need not be independent of the client, the compilation report states that there is no verification and "no assurance is expressed," and will note any lack of independence. Moreover, compilations do not require footnotes. Appendix B provides examples of language commonly used by CPA firms for audit, review, and compilation reports.

Thus, across verification levels, there is substantial variation in work effort and assurance attained and expressed. These differences make it clear that material misstatement likelihood depends on both the private company's integrity, quality of internal control and choice of verification level, as well as the CPA firm's performance whether as auditor, reviewer or compiler.[10] For our study, it is important to note that review procedures are a *subset* of audit procedures and compilations have *zero* verification procedures. Therefore, comparison of reviews to compilations and audits allows incremental assessment of effectiveness of confirmatory data analytics and inquiries as the sole verification procedure, as well as the incremental contribution of internal control and detailed verification procedures of a "full audit."

2.2. Prior literature

Several recent studies find that audited annual financial statements are associated with better FRQP scores than are non-audited financial statements, but little is known about the association between FRQPs and reviewed annual financial statements. For U.S. private firms, Minnis (2011) investigates and finds that the predictability of accruals for future cash flows is higher for audited than non-audited financial statements (i.e., which include both reviews and compilations), and footnotes that this predictability does not appear to vary between reviews and compilations. In contrast, we isolate four levels of CPA firm verification: audits, reviews,

[10] Because Sageworks (our data source) does not report private company or CPA firm identities, we cannot assess performance quality across CPA firms (e.g., Gaynor et al. 2016).

compilations, and no known association with a CPA firm (which we designate "company-prepared" financial statements).

Botosan et al. (2018) use a sample of U.S. public firm's audited annual and related reviewed quarterly financial statements to compare FRQP scores using the Financial Statement Divergence (FSD) score based on Benford's law (Amiram et al. 2015). They find that audited annual financial statements contain less "error" than the associated reviewed quarterly financial statements, but it is difficult to generalize their findings to private firms because of the significantly different regulatory and capital market environments. Also, because the CPA firm reviewing a public company quarterly filing also audits the firm's subsequent annual filings (as well as year-end internal controls), it is not clear such reviews are comparable to a stand-alone review of annual financial statements.

Two prior studies consider alternative FRQP metrics for private firms. Foster et al. (2016) investigate the effect of different verification regimes (i.e., public company PCAOB-audit, private company GAAS-audit, and private company review) on a measure of "abnormal production" for a set of both public and private manufacturing firms in the U.S. They find that audited public (private) firms tend to engage in income-decreasing (income-increasing) real earnings management, and reviewed private firms seem not to engage in real earnings management.[11] Clatworthy and Peel (2013) use subsequent "amendments" to financial statements of U.K. private firms as an accounting quality measure to examine the impact of audits and governance. They find that unaudited financial statements are more likely to be amended than are audited financial statements. They leave unexplored the effects of "less than audit" verification levels.

[11] GAAS-audit refers to an audit following AICPA standards for private firms, rather than use of PCAOB auditing standards, which are required for public issuers.

A related line of research documents private firms' accounting and audit service choices from the users' side. For example, what do lenders request from private firms when seeking information and monitoring loans, and how do private firms respond (Minnis and Sutherland 2017; Berger et al. 2017; Lisowsky et al. 2017)? This research reveals financial statement-related information and assurance desired by lenders, and the resulting information supplied in a market without financial reporting regulation. These related papers do not measure verification costs or provide evidence on the association between verification services and FRQPs.

In addition to investigating the association between verification services and FRPQs, we examine the association between verification services and cost of debt. The motivation underlying this analysis is the potential that cost of debt may capture some benefits of verification services that are not captured by FRQPs. The belief that higher assurance levels reduce a firm's cost of debt is well established among policymakers. For example, Levitt (1998) suggests that regulators "recognize the ultimate advantage of an efficient and trustworthy financial reporting system – a lower cost of capital." More narrowly focused on audits, PCAOB chairman, James Doty, is much more specific and maintains:

> **"**Whether the audit is compulsory or not, the companies seeking capital pay for audits to receive a benefit. That benefit is in the form of a lower cost of capital than capital-market participants would otherwise require, access to more capital markets, and greater investor demand for their securities" (Doty 2014).

Scholarly studies also provide evidence that audits are associated with a lower cost of debt. In an experiment with 67 bankers, Bandyopadhyay and Francis (1995) find that reviews yield lower cost of debt than compilations (28 basis points), and audits yield lower cost of debt than reviews (25 basis points). Also, as an indication of the complex interaction among factors, they find that the bankers' assessment of the probability of making a loan is 0.26, 0.48, and 0.62 when a borrower has compiled, reviewed, and audited financial statements, respectively. Blackwell et

al. (1998) use 212 revolving credit agreements from six banks and estimate that firms with audited financial statements pay lower interest rates (about 25 basis points), and that this interest rate reduction covers from 28% to 50% of typical audit fees. The authors also note that reviews cost about one-third the cost of an audit. Minnis (2011) uses the Sageworks dataset and finds that audited financial statements are associated with lower cost of debt.

Blackwell et al. (1998) do not separately estimate differences in cost of debt between reviews and compilations or between reviews and audits. Minnis (2011, p. 494) finds no difference in cost of debt between reviews and compilations. We extend Bandyopadhyay and Francis (1995), Blackwell et al. (1998), and Minnis (2011) by conducting exploratory and limited comparative cost-benefit analyses among and between CPA firm verification services using (a) cost of debt as an important component of firms' cost of capital, and (b) an estimate of verification service fees.

Understanding the benefits and costs of alternative verification services in general, and reviews in particular, is important because reviews may be a cost-effective alternative to audits for both public and private firms. As pointed out above, under Regulation CF the SEC already permits public firms in certain circumstances to file reviewed, rather than audited, financial statements. Further, audits are becoming costlier due to new regulations and the increasing complexity of U.S. GAAP, and the cost effectiveness of reviews will likely be strengthened by advances in data analytics and software (Murphy and Tysiac 2015).[12]

3. Research Design

3.1. Primary empirical specification

To examine the association between verification level and verification outcome measures, we use OLS to estimate the following regression model, with standard errors clustered by firm:

[12] Badertscher et al. (2014) provide some evidence on the relative cost of private firm audits in a study of public debt issuers with private equity.

$$VOM_{i,t} = \beta_0 + \beta_1 Compile_{i,t} + \beta_2 Review_{i,t} + \beta_3 Audit_{i,t} + \Sigma\beta_k Controls_{i,t} + IndustryFE + YearFE + \varepsilon_{i,t}, \quad (1)$$

where *VOM* (verification outcome measure) represents either one of our four alternative model-based FRQPs (described below), or cost of debt. *Compile* (*Review, Audit*) is an indicator that equals one if firm *i*'s year *t* financial statements were compiled (reviewed, audited) and zero otherwise, and the intercept includes company-prepared statements.

Following Minnis (2011) and Hope et al. (2013), we include the following control variables for firm *i* in year *t*: natural log of total assets (*LnAssets*); percentage change in sales squared (*SalesGrowthSq*) to capture non-linearities in the relation between sales growth and reporting quality (Collins et al. 2017); debt-to-assets ratio (*Leverage*); the ratio of current assets to current liabilities (*CurrRatio*); an indicator variable that equals one if the firm is a Subchapter C corporation and zero otherwise (*CCorp*); property plant and equipment deflated by total assets (*PPEta*); an indicator variable that equals one if total shareholders' equity is negative (*NegEquity*); and interest coverage ratio (*IntCoverage*). In Eq. (1), β_1 (β_2, β_3) estimates the effect of a compilation (review, audit) on verification outcome measures relative to company-prepared statements.

Because private companies are able (to some degree) to select verification level, there is concern about endogeneity when interpreting the results from estimating Eq. (1). To mitigate this concern we also estimate propensity-score-weighted (PSW) regressions (McCaffrey et al. 2013; Austin and Stuart 2015; Guo and Fraser 2015), a popular method of addressing self-selection that is applicable for studies with multiple treatments, and preserves all observations for use in the regression estimation. The PSW estimation is conducted in two steps. First, we estimate the following multinomial logistic model (Guo and Fraser, 2015), which employs the same set of

determinants used in Eq. (1) and is consistent with determinants used in existing audit choice models (e.g., Kausar et al. 2016; Minnis 2011):

$$\begin{aligned} Assur_{i,t} = {} & \beta_0 + \beta_1 LnAssets_{i,t} + \beta_2 SalesGrowthSq_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 CurrRatio_{i,t} \\ & + \beta_5 CCorp_{i,t} + \beta_6 PPEta_{i,t} + \beta_7 NegEquity_{i,t} + \beta_8 IntCoverage_{i,t} \\ & + IndustryFE + YearFE + \varepsilon_{i,t}, \end{aligned} \quad (2)$$

where *Assur* equals 1, 2, 3, or 4 if firm *i*'s year *t* financial statements are company-prepared, compiled, reviewed, or audited, respectively, and all other variables are as previously defined. Eq. (2) yields a generalized propensity score corresponding to each of the four verification levels for each sample observation (i.e., each observation receives a score that indicates the likelihood that the observation has company-prepared, compiled, reviewed, and audited financial statements, based on the firm characteristics included in the model).[13] Then, for each observation we retain only the generalized propensity score that corresponds to the actual treatment (e.g., for an observation that received an audit, we retain the generalized propensity score for "audit").

In the second step, we estimate Eq. (1) using the inverse of each observation's generalized propensity score as a sampling weight. To mitigate the impact of outlier weights, we normalize each observation's inverse propensity score by multiplying it by the expected value of being in the respective treatment (a technique referred to as "stabilization" – see Harder et al. 2010). For a sensitivity test, we also trim observations with very high and low inverse propensity scores.[14]

[13] Because there are four *Assur* indicator variables, the multinomial logistic model estimates three models with one *Assur* level used as the referent group, which leads to 24 estimated coefficients, not including fixed effects (i.e., 8 predictors times 3 models). In this untabulated estimation, 22 of the 24 coefficient estimates are significant at the $p<0.01$ level, and the pseudo-R-squared is 34.58%.

[14] It must be noted that, although this approach helps mitigate the potential confounding effect of self-selection, it is subject to the same concerns and assumptions inherent in propensity score matching (Minnis 2011; Shipman et al. 2017). That is, inferences are susceptible to selection on unobservables if the observable variables included in the model do not account for all differences in treatment.

3.2. Model-based financial reporting quality proxies

There is no universally accepted FRQP for public companies (Dechow et al. 2010; DeFond and Zhang 2014) and perhaps even less agreement for private companies (Hope et al. 2013).[15] Therefore, we consider four FRQPs broadly used in extant literature (recognizing that each has conceptual limitations, as discussed below), each of which is inversely related to reporting quality (i.e., lower values are associated with better reporting quality).

First, we consider a "Financial Statement Divergence Score" (*FSDScore*) based on Benford's Law. Benford's Law describes the theoretical distribution of all "first digits" that appear in a given naturally occurring population of numbers, has been shown to apply to financial statement data (Amiram et al. 2015), and has been advocated as a test for reliability of accounting data in the auditing literature (e.g., Nigrini and Mittermaier 1997; Durtschi et al. 2004; Nigrini and Miller 2009). Following Amiram et al. (2015) we measure *FSDScore* using the mean absolute deviation statistic:

$$FSDScore_{i,t} = \left(\sum_{k=1}^{K} \left| AD_{k,i,t} - TD_k \right| \right) / K, \tag{3}$$

where *AD* is the actual distribution of each leading digit for each line item in firm *i*'s year *t* financial statements, *TD* is the theoretical distribution of each leading digit under Benford's Law, and *K* is the number of distinct leading digits for line items that appear in firm *i*'s year *t* financial statements.[16] Larger values of *FSDScore* are presumed to reflect accounting errors whether accidental or intentional (i.e., fraudulent), and thus lower financial reporting quality. One advantage of *FSDScore* relative to accrual-based FRQPs (described below) is that there is no clear

[15] Hope et al. (2013) find that relative to public firms, private firms show lower accrual quality and less conservatism.
[16] We include all financial statement data items that appear in Sageworks for a given year, which include data from the income statement and balance sheet. The average number of data items for a firm-year is 74.

reason why a measure based only on properties of numerical distributions would be ex-ante correlated with innate firm characteristics, which mitigates endogeneity concerns.

Our second FRQP (*FScore*) is based on the material misstatement likelihood measure developed by Dechow et al. (2011). Because some Dechow et al. (2011) predictors either do not apply or are not available for our private firms (e.g., stock market data, off-balance-sheet variables), we compute *FScore* using the corresponding data that we have available, as follows:

$$\begin{aligned} PredictedValue = {} & \text{-}7.893 + 0.790*(rsst\_acc) + 2.518*(ch\_rec) + 1.191*(ch\_inv) \\ & + 1.979*(soft\_assets) + 0.171*(ch\_cs) + (\text{-}0.932)*(ch\_roa), \end{aligned} \tag{4}$$

where the component variables are as defined in Appendix C (within the definition of *FScore*). We then compute *FScore* as:

$$FScore = \left[\frac{e^{(PredictedValue)}}{\left(1 + e^{(PredictedValue)}\right)} \right] / 0.0037, \tag{5}$$

where larger values of *FScore* imply a higher probability of material accounting misstatement.

Our third and fourth FRQPs are two traditional accrual-based measures from a variant of the modified cross-sectional Jones (1991) model. Specifically, we first estimate the following regression annually for each two-digit NAICS industry with at least ten observations:

$$\begin{aligned} Accruals_{i,t} = {} & \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \left[\frac{\left(\Delta Sales_{i,t} - \Delta Receivables_{i,t}\right)}{Assets_{i,t-1}} \right] + \alpha_3 \frac{PPE_{i,t}}{Assets_{i,t-1}} \\ & + \alpha_4 ROA_{i,t} + \alpha_5 SalesGrowth_{i,t} + \varepsilon_{i,t}, \end{aligned} \tag{6}$$

where *Accruals* is total accruals, *Assets* is total assets, Δ*Sales* is annual change in sales, Δ*Receivables* is the change in trade receivables, *PPE* is net property, plant, and equipment, *ROA* is return on assets (Kothari et al. 2005), and *SalesGrowth* is the percentage change in sales from year *t*-1 to year *t* (Collins et al. 2017). All variables are further defined in Appendix C. The residual from Eq. (6) is a proxy for discretionary, or "abnormal" accruals (*AbAccruals*) (Jones 1991).

Following prior studies, our third FRQP is the unsigned residual, |*AbAccruals*|, which is generally interpreted as a measure of reporting quality (e.g., Dechow and Dichev 2002; Aobdia et al. 2015). Our fourth FRQP is the signed residual, *AbAccruals*, which is generally interpreted as a measure of directional earnings management.

As to limitations of these FRQPs, *FSDScore* is devoid of accounting intuition that facilitates economic interpretation, and *FScore,* to our knowledge, has not been validated for private firms. A key disadvantage of the accruals-based FRQPs is that discretionary accruals estimated using a Jones-model approach are correlated with firm economic fundamentals.[17]

3.3. Cost of debt

As discussed above, our economics-based *VOM* benefits measure, cost of debt, reflects not only observable financial reporting quality (as do model-based FRQPs), but also reflects individual borrower and lender choices based on management's knowledge of its own unobservable quality, integrity, and future prospects for the entity, as well as the lender's perception and other contextual factors (e.g., implicit lender "insurance" from the CPA firm that comes with higher verification levels). To assess the association between verification services and cost of debt, we estimate Eq. (1) with $CostOfDebt_{i,t+1}$ as *VOM*, where we follow Minnis (2011) and measure *CostOfDebt* as interest expense in year $t+1$ divided by average debt (*Debt*) outstanding in year $t+1$ (where *Debt* equals total liabilities). Also as in Minnis (2011), we truncate *CostOfDebt* at the upper and lower 5% levels, and code *CostOfDebt* as missing for any firm years where *Debt* more than doubles or reduces by half relative to the prior year.

[17] As examples, see Hribar and Nichols (2007); Dechow et al. (2010); Ball (2013); DeFond and Zhang (2014); Owens et al. (2017).

3.4. Verification service fees

To explore the relative costs as well as benefits of an audit, review, or compilation we obtain confidential verification service fee data from a mid-market accounting firm based in the U.S. that serves private firms similar in size to those in Sageworks. Our fee data are from 424 unique engagements (the "full-fee sample") comprised of 50 compilations, 138 reviews, and 236 audits from 2015 and 2016 for which no client appears more than once. We also separately consider a subset of these fee data for client firms with assets from $1.94 million to $7.50 million to provide even better overlap with our Sageworks firms (the "size-representative-fee sample"), comprised of 179 unique engagements (76 audits, 77 reviews, and 26 compilations). We do not have client firm identities, and the only data (aside from verification service level) we have for client firms is total assets, which ranges from approximately $58 thousand to $488 million in the full-fee sample.

We estimate the following model to obtain cost coefficients for each service level using both the full-fee sample and the size-representative-fee sample:

$$\begin{aligned} AssurFees_i = {} & \delta_0 Compile + \delta_1 Review_i + \delta_2 Audit_i + \delta_3 Compile * Assets_i + \\ & \delta_4 Review * Assets_i + \delta_5 Audit * Assets + \varepsilon_i, \end{aligned} \tag{7}$$

where *AssurFees* is the fee associated with the CPA firm verification service, *Compile*, *Review*, and *Audit* indicators estimate fixed costs for each verification level, and each verification level is interacted with *Assets* to estimate variable costs. We use the estimated coefficients from Eq. (7) to compute implied fees for our Sageworks observations to allow possible insights into the relative costs and benefits of different verification service levels.

We consider this analysis to be exploratory and suggestive, rather than definitive, due to data limitations. Our fee data are from clients that overlap substantially with our Sageworks sample in terms of firm size; therefore, results that combine fee and cost of debt evidence are not likely

affected by size differences. However, we have no insights into comparative market areas, market conditions, or decisions of private company client management or lenders. Despite these limitations, our financial and verification service fee data are the most comprehensive of which we are aware for private firms. [18] Therefore, this analysis should be of some help to scholars and regulators wishing to assess the costs relative to the benefits of each verification service level.

4. Data and Descriptive Statistics

4.1. Sample selection

We obtain firm-year financial statement data for private firms from Sageworks, Inc.[19] Sageworks contains both income statement and balance sheet items (similar to the corresponding data structure in Compustat for public firms), but does not provide statement of cash flow data. Additionally, Sageworks provides the verification service level chosen for each firm-year of accounting data, and basic demographic information such as geographic location and North American Industry Classification System (NAICS) industry codes. This unique combination of data allows us to explore the association between financial reporting quality and verification service levels.[20]

Table 1 details our Sageworks sample selection process. Following Minnis (2011) and Badertscher et al. (2013), we exclude Canadian firms, as well as observations with missing financial data or for which the accounting numbers fail to satisfy basic accounting identities (which

[18] Abdel-Kahlik (1989) reports a difference in audit and review fees of $9,000. We are not aware of any other fee data.
[19] Sageworks collects private firm financial data from banks and accounting firms, including large national accounting firms and smaller regional firms. Sageworks collects confidential financial statement information of non-listed clients of large and regional accounting firms, and sells the data, aggregated by industry and region, with financial tools to its clients who are the accounting firms, banks and other financial institutions. For research purposes only, Sageworks granted some researchers confidential access to the non-aggregated data with firm names removed and unique firm identifiers substituted. This dataset has recently been used in several accounting and finance studies (e.g., Minnis 2011; Badertscher et al. 2013; Badertscher et al. 2014; Hope et al. 2013; Lisowsky and Minnis 2018).
[20] Sageworks assigns each firm a unique firm identifier that cannot be matched with any other data set, and the CPA firm providing the verification services are not identified or characterized in any way.

suggests data errors). We follow Badertscher et al. (2013) and exclude financial firms (finance and insurance industries, NAICS code 52) and utilities (NAICS code 22) because of their different business models. Finally, we exclude firms with total assets less than $1 million, and we winsorize all continuous variables at 1% and 99%. The data span ten fiscal years from 2001 through 2010. We have a total of 103,114 firm-years and 41,280 firms with all necessary variables (the "full sample"). To maximize balance in sample coverage of various verification levels and reduce the risk of size-driven results, we focus on a sub-sample of observations with assets in the middle deciles of the full sample (i.e., assets ranging from $1.94M to $7.5M) (the "size-representative sample"), which consists of 51,557 firm-year observations across 22,782 distinct firms.[21]

4.2. Verification services by size and industry

To better understand how verification service levels vary with firm size, we partition our full sample into deciles based on total assets. Panel A of Table 2 reports the frequency of audit, review, compilation, and company-prepared financial statements for each asset decile. For instance, in the smallest asset decile, the percentage of audit, review, compilation, and company-prepared statements is 6.0%, 40.6%, 51.6%, and 1.8% respectively. In contrast, in the largest asset decile, the percentages are 60.9%, 20.0%, 18.0%, and 1.1% respectively. For the middle deciles, service levels are more nearly equal. It is noteworthy that a sizeable number of very large firms obtain reviews and compilations and a non-trivial number of very small firms obtain audits.

For perspective, we obtain a comparative sample of public firms from Compustat that meet the same data availability criteria. The median (10^{th} percentile) audited public firm has total assets

[21] Throughout our analyses, inferences are unaltered if we instead use the full sample. In addition, we also examine a "constant sample" (20,324 firm-year observations) comprised of 5,081 firms that are in the full sample in all years from 2005-2009 (chosen because this period coincides with the broadest coverage available within Sageworks) to ensure that our results are not driven by firms that exit the sample. All results are similar when examining the constant sample.

of $198 ($3.7) million. Accordingly, although our private firm sample is considerably smaller in size than a typical public firm sample, our sample contains approximately 23,869 firms (56,072 firm-years) that would be at or above the 10th percentile of assets in the public-firm distribution. Panel B of Table 2 shows that the largest percentage of private firms is in the Construction and Construction Materials industry, followed by Wholesale.[22] The distribution of public and private firms across industries is generally similar.

Across all industries the average percentage of firm years receiving audit assurance is 22.6%, yet there is considerable variation among industries. For example, Retail has only 15.0% of firm-years receiving an audit, while Tobacco Products has 64.7%. Similarly, the average percentage of firm years receiving a review is 44.3%, yet Construction and Construction Materials has 54.5% while Petroleum and Natural Gas has only 9.0%. As another example of industry-level variation, the average percentage of firm years receiving a compilation is 31.8%, yet Restaurants, Hotels, Motels has 47.6% while Tobacco Products has only 17.6%.

4.3. Descriptive statistics

Panel A and Panel B of Table 3 present descriptive statistics for the full sample and size-representative samples as a whole and within each verification category. By construction, the size-representative sample has lower mean *Assets* than the full sample (5.369 vs. 9.591). Descriptive statistics of all other variables are of the same general magnitude across samples, which highlights that the basic relations in the data are not driven by firms in the tails of the size distribution. Accordingly, we focus discussion on the size-representative sample.

The univariate statistics reveal a fairly systematic pattern in the data. Specifically, mean *FSDScore* increases monotonically from the audited statements (0.053) to the company-prepared

[22] We asked a CPA firm partner to explain the concentration of construction clients and were told that much of this is due to bonding requirements for construction companies.

statements (0.056). *FScore* likewise generally increases as verification levels decrease, although reviewed statements have a slightly lower *FScore* than do audited statements. For |*AbAccruals*|, the mean and median across all observations is 0.099 and 0.069, respectively, which is similar in magnitude to corresponding data from public-firm studies (Owens et al. 2017) and other private-firm studies (Hope et al. 2013). *Review* firm years have the lowest mean |*AbAccruals*| (0.097). *CostOfDebt* is lowest for the *Audit* firm years (0.073) and highest for *Compile* firm years (0.120). The overall mean and median *CostOfDebt* is comparable to descriptive statistics in Minnis (2011).

Turning to the control variables, we note that firms in the size-representative sample are not "mom-and-pop" firms, with mean (median) assets of $5.4 ($4.8) million. As expected, audited firms are the largest, on average. Specifically, mean *Assets* across audited, reviewed, and compiled firm years are $6.1, $5.3, and $4.9, respectively. Aside from size, we note no particular patterns in control variables across verification levels, reinforcing the need to control for firm size in our multivariate regressions. Overall, the control variables have similar distributional properties as those reported in Minnis (2011) and Badertscher et al. (2014).

Panel C of Table 3 displays the Pearson and Spearman correlations for the size-representative sample. Consistent with the descriptive statistics in Panels A and B, higher levels of verification are generally associated with better FRQP scores. For example, *Audit* (*Compile*) is negatively (positively) correlated with *FSDScore*. *Audit* is positively correlated with *Assets*, *SalesGrowth*, and *Debt*, while *Compile* and *Review* are negatively correlated with these variables. These findings suggest that firms that are larger and have more growth opportunities tend to obtain higher levels of verification. Overall, the correlation patterns are consistent with prior work (Minnis 2011; Badertscher et al. 2014).

5. Empirical Results

5.1. Verification service levels and financial reporting quality

Table 4 presents results from estimating Eq. (1) for the size-representative sample, using our four alternative FRQPs. We report results from both OLS regression and propensity-score-weighted regression, and although we focus on the OLS results, note that our results are remarkably similar across approaches. The coefficients on *Compile*, *Review*, and *Audit* capture incremental effects of verification relative to company-prepared financial statements, which is included in the intercept. There are two key takeaways from Table 4. First, FRQP scores are generally lower for higher verification levels (indicating better financial reporting quality), where most differences are statistically significant. Second (and somewhat surprisingly), audits and reviews have similar FRQP scores, where in some cases audited FRQPs are nominally worse than reviews.

As reported in Column (1) (where *FSDScore* is the FRQP), the coefficients on *Compile*, *Review*, and *Audit* are all significantly negative, with a monotonically increasing (absolute) coefficient magnitude as verification level increases. This provides evidence that CPA firm involvement of any kind is positively associated with reporting quality. In pairwise comparisons, the coefficients on *Compile* and *Review* are –0.0021 and –0.0041, respectively, where an F-test indicates that the two coefficients are significantly different. This suggests that a financial statement review is associated with better reporting quality than a compilation. An F-test of the *Review* and *Audit* coefficients (–0.0041 vs. –0.0045, respectively) reflects a significant difference, suggesting that an audit results in better reporting quality than a review. Column (2) reports similar results using propensity-score-weighted regression. Thus, even after addressing the potential self-selection problem, the FRQP benefits of an audit relative to a review seem quite modest.

The results in Columns (3) through (8) using other FRQPs show one salient contrast with the results in Columns (1) and (2). Namely, audits and reviews generally exhibit statistically indistinguishable FRQPs. For example, Column (3) presents results using *FScore* as the FRQP and shows both reviews and audits are associated with better FRQP scores relative to compiled financial statements, but audit and reviews have statistically indistinguishable FRQP scores. As another example, Column (5) presents results using unsigned abnormal accruals (|*AbAccruals*|). Consistent with Column (1), the coefficients on *Compile*, *Review*, and *Audit* are all significantly negative (p-value < 0.01), which again provides evidence that CPA firm involvement of any kind is positively associated with reporting quality. F-tests again indicate that reviews leads to significantly better FRQPs than compilations, but there is no statistical difference between reviews and audits. Further, in columns (3) through (6) (i.e., FScore and |AbAccruals|), reviews are nominally *superior* to audits and for the PSW column (6) review and audit scores are significantly different (at p = 0.10) *in favor of reviews*. Likewise, Columns (7) and (8) (which uses signed abnormal accruals) show no significant FRQP difference between reviews and audits. Overall, our results suggest that, *on average*, audits and reviews exhibit little difference in model-based FRQPs.

5.2. Relative importance of audit-specific verification procedures

To test whether the modest FRQP difference between reviews and audits applies across contexts, we test for FRQP differences for a subset of firms where "full audit" verification procedures would be expected to be more effective—firms with large inventories, which are often subject to internal control problems and accounting errors or manipulation for which control evaluation and detailed counting and pricing tests should be diagnostic. We partition sample firm-

years that have a low-to-moderate versus high inventory-to-total-asset ratios by bifurcating at the 75th percentile (0.331), and estimate Eq. (1) separately for each partition.

Table 5 presents OLS results (again, using the size-representative sample), where columns (1)-(4) (columns 5-8) report results for the low-to-moderate (high) inventory percentage partition. Inferences from the low-to-moderate inventory partition mimic those of our primary analyses. Specifically, there is no statistical difference in scores between review and audits using *any of our four* FRQPs. In contrast, there are markedly better scores for audited relative to reviewed financial statements for the high inventory percentage group using *all four* FRQPs, consistent with the notion that "context matters" when it comes to the question of whether the additional control and detailed verification procedures that come with an audit yield reporting quality benefits.

5.3. Verification service levels and cost of debt

Table 6 presents the results of estimating Eq. (1) for the size-representative sample using *CostOfDebt* in year *t*+1 as the dependent variable. Column (1) presents OLS estimates of audit effects on cost of debt, relative to reviews, compilations, and "unknown" association combined with other factors in the (suppressed) intercept. Audited firm years are associated with an interest rate advantage of 77 basis points relative to non-audited firm years. This is consistent with Minnis (2011), who found that audit (versus all non-audit) cases ranged between 25 and 105 basis points, depending on specification, as well as Blackwell et al. (1998), who find a 25 basis point advantage for audits. Columns (2) and (3) isolate estimates of the compilation and review effects. There are negative and significant coefficients on *Review* and *Audit*, whereas *Compile* is insignificant, consistent with relatively little effect on cost of debt from obtaining a GAAP-compliant financial statement compilation with no assurance provided. However, as indicated by the F-tests, there is a significant reduction in cost of debt among and between compilations, reviews, and audits. For

example, the OLS coefficient estimates on *Compilation*, *Review* and *Audit* in Column (2) are –0.0021, –0.0083 and –0.0136, respectively, suggesting that firms with reviews average 62 basis points less than compilations, and 53 basis points more than audits.

In summary, the cost of debt analysis in Table 6 is consistent with the model-based FRQP analysis in Table 5 in that both reviews and audits have a larger effect than compilations, and reviews are associated with a substantial portion of the full benefit differential between compilations and audits. In contrast, there is also a statistically significant and economically important difference in the cost of debt between audited and reviewed financial statements, which suggests that the economics-based cost of debt measure indeed may reflect benefits associated with the audit service that model-based FRQPs do not capture.[23]

5.4. Exploratory cost/benefit analysis

To complete our economics-based net benefits analysis, we explore the relation of verification service fees to cost of debt benefits. Panel A of Table 7 presents results from estimating Eq. (7). Due to the small number of compilations in the size-representative-fee sample, we focus on the full-fee sample (Column 1) for discussion. The fixed cost coefficients on *Compile*, *Review*, and *Audit* are 5,514, 14,584, and 23,584, and the variable cost coefficients are 0.1334, 0.0043, and 0.2079, respectively; all of which are statistically significant with the exception of review variable cost, which is near zero. As shown in Panel B, these estimates translate to an implied fee for a compilation, review, and audit of $6,417, $14,550, and $27,702, respectively, for the average size private firm.[24]

[23] We repeat our earlier FRQP analyses using the cost of debt sample, and inferences are unchanged.
[24] Based on the assumption that the ratio of fees to assets is stable through time, we use the regression results from Table 7 to infer the fee data for the Sageworks data years.

In Panel C of Table 7, we relate the verification service differentials in basis points and verification fees for an average-size Sageworks sample firm. Dividing the difference in fees for a higher verification level by the difference in cost of debt yields the point at which the higher verification level becomes "profitable" (i.e., the "break even" point). Focusing on the full-fee sample, for a firm with total debt above $1.3 million ($2.5 million), reviews are cost-effective relative to compilations (audits are cost effective relative to reviews). While there are a number of critical assumptions that must be made for these estimates to have validity, this analysis provides some quantification that bears relevance for the SEC's exemptions of some small private issuers (e.g., using crowd-funding) from reviews and/or audits (SEC 2016).

5.5. Supplemental analysis—changes in verification service levels and FRQPs

To mitigate concerns in our primary analysis that both FRQP *levels* and verification service *levels* are correlated with time-invariant firm characteristics, we examine the association between changes in verification and changes in FRQPs. Specifically, we estimate the following regression model, with standard errors clustered by firm:

$$\begin{aligned}\Delta FRQP_{i,t} = {} & \beta_0 + \beta_1 AssurDnAtoR_{i,t} + \beta_2 AssurDnOther_{i,t} + \beta_3 AssurUpRtoA_{i,t} \\ & + \beta_4 AssurUpOther_{i,t} + \Sigma\beta_k \Delta Controls_{i,t} + IndustryFE + YearFE + \varepsilon_{i,t}\end{aligned} \quad (8)$$

where *AssurDnAtoR* (*AssurUpRtoA*) is an indicator that equals one if the firm decreases (increases) its assurance from audit (review) in year t–1 to review (audit) in year t. *AssurDnOther* (*AssurUpOther*) is an indicator that equals one if the firm decreases (increases) its assurance in any other combination from year t–1 to t, i.e. audit to compilation, review to compilation, or compilation to company-prepared (compilation to review, compilation to audit, or company-prepared to review). Accordingly, $\beta_{1\text{-}4}$ capture the effect of verification level changes on FRQP changes, relative to observations with no changes in verification (as captured by the intercept).

Before presenting results from estimation of Eq. (8), in Panel A of Table 8 we provide

some descriptive data on the frequency with which our size-representative sample changes verification levels from year *t*-1 to *t*. For instance, a firm that changes from an audit to a review from one year to the next is labeled "–1," a firm that changes from a compilation to an audit is labeled "+2," and a firm that changes from an audit to company-prepared is labeled "–3." Over 95% of firm-years exhibit no change in verification level (i.e., 49,764/51,557). Among firm years with a change, nearly the same amount of firm years move up two levels and down two levels (238 and 208, respectively). While there are very few firm-years that move three levels, it is more common to move from audit to company-prepared (42 firm years) than vice versa (9 firm years).

Panel B of Table 8 presents results from estimating Eq. (8). To summarize, there is broad support for the inferences drawn in our primary analysis. First, there is no statistically significant change in any FRQP from changes in verification levels between audit and review, either in moving up from review to audit (*AssurUpRtoA*), or in moving down from audit to review (*AssurDnAtoR*). Second, there are statistically significant changes in FRQP (in the expected directions) when verification levels change across other combinations. For example, the coefficient estimates on *AssurDnOther* are significantly positive using three of the four quality proxy measures, suggesting a decrease in FRQP when verification decreases (other than a decrease from audit to review).[25] In short, these results indicate that time-invariant firm characteristics are an unlikely explanation for our primary inferences regarding verification levels and FRQPs.

6. Conclusion

The relative costs and benefits of financial statement verification levels are the subject of increasing attention by investor advocates, regulators, and scholars. Absent from this discussion is empirical evidence on the relative financial reporting quality benefits across alternative

[25] Given our low frequency of company-prepared observations, we re-ran all analyses without company-prepared observations and our results are unchanged (untabulated).

verification service levels available to private firms and potentially available to some public firms. In this study, we address this gap by providing evidence on the association between verification service levels, financial reporting quality proxies (FRQPs), and cost of debt. Further, we use confidential verification service fee data to approximate relative costs for the various verification service levels to provide some economic perspective for interpreting our FRQP results.

We find consistent evidence that FRQPs are better (i.e., lower scores) for higher levels of verification. However, the biggest FRQP difference appears between compilation and review with an insignificant difference between review and audit. Because audits are on average about twice as expensive as a review, our evidence suggests that top-down, limited verification procedure financial statement review is a particularly cost-effective service that yields reporting quality scores that are comparable to an audit, on average. In contrast, we document that, relative to reviewed financial statements, audited financial statements are associated with significantly lower cost of debt. Taken together, these results suggests that cost of debt reflects benefits of audits that FRQPs do not capture (e.g., implicit assurance about internal controls, management attitudes, lower *perceived* risk of material financial misstatement). Results also suggest that differences in verification procedures across assurance levels require thoughtful analysis, and have implications for evaluating the cost effectiveness of review versus audit procedures that include internal control evaluation and detailed verification tests.

Our study is subject to several important caveats. First, our private firm data permits computation only of relatively noisy FRQPs, and our cost data represent approximations. Second, our analysis does not purport to be a complete analysis of all costs or benefits involved in a firm's choice of verification service level. Finally, although we attempt to mitigate potential endogeneity concerns via propensity-score-weighted regression (and a changes analysis), this approach does

not fully address selection bias. The maintained assumption is that unobservable (or omitted) variables not included the first-stage model of verification level choice do not systematically affect FRQPs. However, prior studies offer little guidance on the determinants of verification choice for private firms, which renders it difficult to directly assess the potential confounding effect of variables not included in the first-stage model.

Nonetheless, overall our results provide some evidential basis for making decisions about verification levels for firms with alternatives, and for regulators who may be considering relaxing mandates for a particular verification level. Further, our results suggest that analytical procedures warrant further research by practitioners and scholars through advances in confirmatory data analytics. Finally, regulators and standard setters might consider the relative cost-benefit tradeoffs from high level confirmatory data analytics against intensive audit procedures for internal control over financial reporting.

Appendix A – CPA Firm Verification Service Descriptions (source: AICPA)

Comparative Snapshot			
	Compilation	**Review**	**Audit**
Level of Assurance Obtained by the Accountant/Auditor that the Financial Statements Are Not Materially Misstated	Accountant **does not obtain or provide any assurance** that there are no material modifications that should be made to the financial statements	Accountant **obtains limited assurance** that there are no material modifications that should be made to the financial statements	The auditor **obtains a high, but not absolute, level of assurance** about whether the financial statements are free of material misstatement
Objective	To assist management in presenting financial information in the form of financial statements **without undertaking to provide any assurance** that there are no material modifications that should be made to the financial statements	To obtain **limited assurance** that there are no material modifications that should be made to the financial statements	To obtain a **high level of assurance** about whether the financial statements as a whole are free of material misstatement thereby enabling the auditor to express an opinion on whether the financial statements are presented fairly, in all material respects
Assurance Provided to the User of the Financial Statements	None – the report states that **no assurance is provided**	None – the report provides a statement that **the accountant is not aware of any material modifications** that should be made to the financial statements	None – **the auditor provides an opinion** as to whether the financial statements present fairly, in all material respects, the company's financial position, results of operations and cash flows
The accountant is required to obtain an understanding of the entity's internal control and assess fraud risk			✓
The accountant is required to perform inquiry and analytical procedures		✓	✓
The accountant is required to perform verification and substantiation procedures			✓
Situations requiring different levels of service	Generally appropriate for privately held companies and are **often prepared for simple situations** (e.g., a lender needs GAAP financial statements instead of the statements the internal accounting system produces or the lender needs the comfort provided by knowing that an accountant read the financial statements)	**Often prepared for privately held companies because of requirements of outside third parties** (such as banks, creditors and potential purchasers) that are looking for comfort that the financial statements are not materially misstated	**Often prepared for companies because outside third parties** (such as banks, creditors, potential purchasers and outside investors) **require an auditor's opinion** on the financial statements
Differences in costs for each level of service	Involves the **lowest amount of work** and as a result is **far less costly** than a review or audit	**More costly** than a compilation but **substantially lower in cost** than an audit	**Involves the most work** and therefore the **cost is substantially higher** than a review or compilation

Appendix B –Verification Service Report Examples

CPA Firm's *Audit* Report

We have audited the accompanying balance sheets of X Company as of December 31, 20X2 and 20X1, and the related statements of income, retained earnings, and cash flows for the years then ended. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above, present fairly, in all material respects, the financial position of X Company as of [at] December 31, 20X2 and 20X1, and the results of its operations and its cash flows for the years then ended in conformity with accounting principles generally accepted in the United States of America.

[*Signature*]
[*Date*]

CPA Firm's *Review* Report

I (We) have reviewed the accompanying financial statements of XYZ Company, which comprise the balance sheets as of December 31, 20X2 and 20X1, and the related statements of income, changes in stockholders' equity, and cash flows for the years then ended, and the related notes to the financial statements. A review includes primarily applying analytical procedures to management's (owners') financial data and making inquiries of company management (owners). A review is substantially less in scope than an audit, the objective of which is the expression of an opinion regarding the financial statements as a whole. Accordingly, I (we) do not express such an opinion.

Management's Responsibility for the Financial Statements
Management (Owners) is (are) responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement whether due to fraud or error.

Accountant's Responsibility
My (Our) responsibility is to conduct the review engagements in accordance with Statements on Standards for Accounting and Review Services promulgated by the Accounting and Review Services Committee of the AICPA. Those standards require me (us) to perform procedures to obtain limited assurance as a basis for reporting whether I am (we are) aware of any material modifications that should be made to the financial statements for them to be in accordance with accounting principles generally accepted in the United States of America. I (We) believe that the results of my (our) procedures provide a reasonable basis for my (our) conclusion.

Accountant's Conclusion
Based on my (our) reviews, I am (we are) not aware of any material modifications that should be made to the accompanying financial statements in order for them to be in accordance with accounting principles generally accepted in the United States of America.

[*Signature of accounting firm or accountant, as appropriate*]
[*Accountant's city and state*]
[*Date of the accountant's review report*]

CPA Firm's *Compilation* Report

Management is responsible for the accompanying financial statements of XYZ Company, which comprise the balance sheets as of December 31, 20X2 and 20X1 and the related statements of income, changes in stockholders' equity, and cash flows for the years then ended, and the related notes to the financial statements in accordance with accounting principles generally accepted in the United States of America. I (We) have performed compilation engagements in accordance with Statements on Standards for Accounting and Review Services promulgated by the Accounting and Review Services Committee of the AICPA.

I (We) did not audit or review the financial statements nor was (were) I (we) required to perform any procedures to verify the accuracy or completeness of the information provided by management. Accordingly, I (we) do not express an opinion, a conclusion, nor provide any form of assurance on these financial statements.

[*Signature of accounting firm or accountant, as appropriate*]
[*Accountant's city and state*]
[*Date of the accountant's report*]

Appendix C - Variable Definitions

$AbAccruals_{i,t}$	Firm *i*'s abnormal accruals in year *t*, computed as the residual from estimation of a variant of the modified cross-sectional Jones (1991) model, as outlined in Eq. (6). We estimate the model by industry-year using two digit NAICS industry codes and require that at least 10 observations be available for each industry-year estimation. (data from Sageworks)
$\|AbAccruals\|_{i,t}$	Firm *i*'s absolute abnormal accruals in year *t*, computed as the unsigned residual from *AbAccruals*. (data from Sageworks)
$Accruals_{i,t}$	Firm *i*'s year *t* total accruals, measured as the change in non-cash current assets minus the change in current non-interest-bearing liabilities, minus depreciation and amortization expense. (data from Sageworks)
$Assets_{i,t}$	Firm *i*'s year *t* total assets (millions). (data from Sageworks)
$Assur_{i,t}$	A multinomial variable that equals 1, 2, 3, or 4 if firm *i*'s year *t* financial statements were company-prepared, compiled, reviewed, or audited, respectively. (data from Sageworks)
$AssurDnAtoR_{i,t}$	An indicator that equals one if firm *i* decreases its level of verification from audit in year *t*–1 to review in year *t*, and equals zero otherwise. (data from Sageworks)
$AssurDnOther_{i,t}$	An indicator that equals one if firm *i* decreases its level of verification in any combination other than from audit to review from year *t*–1 to *t*, and equals zero otherwise. (data from Sageworks)
$AssurFees_{i,t}$	Dollar cost of firm *i*'s year *t* assurance services. (data obtained from a Midwest regional accounting firm for 424 client observations)
$AssurUpOther_{i,t}$	An indicator that equals one if firm *i* increases its level of verification in any combination other than from review to audit from year *t*–1 to *t*, and equals zero otherwise. (data from Sageworks)
$AssurUpRtoA_{i,t}$	An indicator that equals one if firm *i* increases its level of verification from review in year *t*–1 to audit in year *t*, and equals zero otherwise. (data from Sageworks)
$Audit_{i,t}$	An indicator that equals one if firm *i* receives a financial statement audit in year *t*, and equals zero otherwise. (data from Sageworks)
$CCorp_{i,t}$	An indicator that equals one if the firm is incorporated under Subchapter C of the Internal Revenue Code, and equals zero otherwise. (data from Sageworks)
$Company_{i,t}$	An indicator that equals one if firm *i* prepares its own financial statements without engaging the services of a CPA firm in year *t*, and equals zero otherwise. (data from Sageworks)
$Compile_{i,t}$	An indicator that equals one if firm *i* receives a financial statement compilation in year *t*, and equals zero otherwise. (data from Sageworks)
$CostOfDebt_{i,t+1}$	Firm *i*'s year *t*+1 interest expense divided by average debt outstanding in year *t*+1. (data from Sageworks)

$CurrRatio_{i,t}$	Firm *i*'s year *t* ending current assets divided by ending current liabilities. (data from Sageworks)
$Debt_{i,t}$	Firm *i*'s year *t* ending total liabilities. (data from Sageworks)
$FScore_{i,t}$	A measure of financial statement misstatement likelihood, where larger values are associated with higher probability of material misstatement. We follow Dechow et al. (2011) as closely as possible given our data availability. Specifically, we compute *FScore* as $[e^{(PredictedValue)}/(1+e^{(PredictedValue)})]/0.0037$, where *PredictedValue* is computed as in our Eq. (4), and 0.0037 is the unconditional probability of financial misstatement, as computed in Dechow et al. (2011). In Eq. (4), *rsst_acc* = [(change in current assets – change in cash) - (current liabilities – change in current long-term debt) + (total assets – current assets) – (total liabilities – current liabilities – long-term liabilities)]/average total assets; *ch_rec* is the change in receivables divided by average total assets; *ch_inv* is the change in inventory divided by average total assets; *soft_assets* = (total assets – net fixed assets – cash)/total assets; *ch_cs* is the percentage change in cash sales, where cash sales equals sales – change in receivables; $ch\_roa = ROA_t - ROA_{t-1}$.
$FSDScore_{i,t}$	Firm *i*'s year *t* financial statement deviation score, which is a measure based on Benford's law that is decreasing in financial reporting quality. *FSDScore* is computed as in Eq. (3), and measures the extent to which the numbers reported in a given set of financial statements deviate from the theoretical distribution of numbers implied by Benford's law. (data from Sageworks)
$IntCoverage_{i,t}$	Firm *i*'s year *t* earnings before interest, taxes, depreciation, and amortization expenses divided by interest expense. (data from Sageworks)
$Leverage_{i,t}$	Firm *i*'s year *t* ending total liabilities divided by ending total assets. (data from Sageworks)
$NegEquity_{i,t}$	An indicator that equals one if firm *i*'s year *t* ending total liabilities are greater than ending total assets, and equals zero otherwise. (data from Sageworks)
$PPE_{i,t}$	Firm *i*'s year *t* ending net value of property, plant, and equipment. (data from Sageworks)
$PPEta_{i,t}$	Firm *i*'s year *t* ending net value of property, plant, and equipment divided by beginning total assets. (data from Sageworks)
$Receivables_{i,t}$	Firm *i*'s year *t* ending trade receivables. (data from Sageworks)
$Review_{i,t}$	An indicator that equals one if firm *i* receives a financial statement review in year *t*, and equals zero otherwise. (data from Sageworks)
$ROA_{i,t}$	Firm *i*'s year *t* return on assets. (data from Sageworks)
$SalesGrowth_{i,t}$	The percentage change in sales from year *t*–1 to year *t*. (data from Sageworks)
$SalesGrowthSq_{i,t}$	*SalesGrowth* squared. (data from Sageworks)

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Table 1 – Sample Selection

Table 1 outlines the drivers of the differential number of observations in the original Sageworks data set and the samples we use in this study (i.e., full and size-representative samples).

Private Firm Sample (2001 - 2010)	# of Firm-Years	# of Firms
Observations with annual accounting reports	473,739	167,475
Observations - Canadian Firms	439,517	156,043
Observations - financial, utilities, and missing industry	422,729	150,105
Observations - firms with total assets < $1M; Sales <0; Equity <0	223,098	77,629
Observations with available control variables - Full Sample	103,114	41,280
Observations with available control variables – Size-Representative Sample	51,557	22,782

Table 2 – Verification Levels by Size and Industry

Panel A of Table 2 reports the percentage of firm-years in each size decile in the full sample that use audit, review, and compilation as the verification level. Panel B of Table 2 reports for the full sample the number of firm-years in each industry category (and the corresponding industry breakdown from a sample of Compustat observations that meet similar data requirements spanning the same sample period 2001-2010), as well as the percentage of firm years in each industry category that use audit, review, and compilation as the assurance level.

Panel A: Frequency of verification level by size (full sample)

		Audit		Review		Compilation		Company		Total
Decile	Assets	N	Decile %	N	Decile %	N	Decile %	N	Decile %	N
1	20.2M - 3.1B	6,282	60.9%	2,061	20.0%	1,853	18.0%	115	1.1%	10,311
2	11.2 - 20.2M	4,168	40.4%	4,090	39.7%	1,920	18.6%	134	1.3%	10,312
3	7.5 - 11.2M	3,110	30.2%	4,967	48.2%	2,108	20.4%	127	1.2%	10,312
4	5.5 - 7.5M	2,561	24.8%	5,084	49.3%	2,531	24.5%	135	1.3%	10,311
5	4.2 - 5.5M	2,015	19.5%	5,264	51.1%	2,923	28.3%	109	1.1%	10,311
6	3.2 - 4.2M	1,559	15.1%	5,291	51.3%	3,318	32.2%	144	1.4%	10,312
7	2.5 - 3.2M	1,223	11.9%	5,114	49.6%	3,848	37.3%	126	1.2%	10,311
8	1.94 - 2.5M	948	9.2%	5,045	48.9%	4,201	40.7%	118	1.1%	10,312
9	1.47 - 1.94M	788	7.6%	4,592	44.5%	4,784	46.4%	147	1.4%	10,311
10	1 - 1.47M	620	6.0%	4,182	40.6%	5,323	51.6%	186	1.8%	10,311
Total		23,274		45,690		32,809		1,341		103,114

Panel B: Frequency of verification level by industry (full sample)

	Private Firm Full Sample						Compustat Comparable Sample		
Industry Category	*N*	% Sample	% Audit	% Review	% Compile	%Company	*N*	% Sample	Diff.
Food Products	4,071	3.9%	26.7%	38.9%	33.2%	1.3%	1,411	2.4%	1.5%
Beer & Liquor	0	0.0%	0.0%	0.0%	0.0%	0.0%	267	0.5%	-0.5%
Tobacco Products	17	0.0%	64.7%	17.6%	17.6%	0.0%	86	0.1%	-0.1%
Recreation	3,760	3.6%	25.9%	38.3%	34.0%	1.7%	1,386	2.4%	1.3%
Printing and Publishing	1,889	1.8%	22.1%	42.8%	34.0%	1.1%	612	1.0%	0.8%
Consumer Goods	1,522	1.5%	26.9%	39.8%	32.4%	0.9%	847	1.4%	0.0%
Apparel	335	0.3%	33.4%	41.8%	23.6%	1.2%	727	1.2%	-0.9%
Healthcare/Pharmacy Products	1,703	1.7%	39.9%	26.2%	31.5%	2.3%	7,223	12.4%	-10.7%**
Chemicals	932	0.9%	29.2%	41.2%	28.9%	0.8%	1,294	2.2%	-1.3%
Textiles	253	0.2%	24.1%	52.6%	22.5%	0.8%	156	0.3%	0.0%

Construction and Construction Materials	32,809	31.8%	20.7%	54.5%	23.9%	0.9%	1,721	2.9%	28.9%***
Steel Works	2,538	2.5%	27.4%	43.3%	28.9%	0.3%	892	1.5%	1.0%
Fabricated Products/Machinery	3,644	3.5%	24.8%	43.3%	31.1%	0.8%	2,101	3.6%	-0.1%
Electrical Equipment	281	0.3%	33.8%	28.1%	37.4%	0.7%	1,050	1.8%	-1.5%
Automobiles and Trucks	442	0.4%	20.8%	49.5%	28.7%	0.9%	886	1.5%	-1.1%
Aircraft, Ships, and Railroad Equipment	511	0.5%	37.4%	25.8%	34.1%	2.7%	419	0.7%	-0.2%
Precious Industrial Metal Mining	700	0.7%	24.3%	40.3%	31.9%	3.6%	1,486	2.5%	-1.9%
Coal	245	0.2%	33.5%	40.4%	24.5%	1.6%	184	0.3%	-0.1%
Petroleum and Natural Gas	167	0.2%	39.5%	9.0%	43.7%	7.8%	3,897	6.7%	-6.5%
Communication	642	0.6%	42.8%	26.6%	27.6%	3.0%	2,668	4.6%	-3.9%
Personal and Business Services	9,544	9.3%	28.4%	35.6%	34.3%	1.7%	8,851	15.1%	-5.9%
Business Equipment	712	0.7%	35.8%	32.4%	29.9%	1.8%	7,954	13.6%	-12.9%***
Business Supplies and Shipping Containers	2,517	2.4%	24.5%	45.5%	29.0%	1.0%	836	1.4%	1.0%
Transportation	2,201	2.1%	20.6%	44.5%	33.6%	1.3%	3,901	6.7%	-4.5%
Wholesale	15,384	14.9%	20.3%	44.6%	34.1%	1.0%	2,054	3.5%	11.4%**
Retail	12,476	12.1%	15.0%	36.7%	46.2%	2.1%	2,757	4.7%	7.4%*
Restaurants, Hotels, Motels	1,625	1.6%	19.6%	30.6%	47.6%	2.2%	987	1.7%	-0.1%
Everything Else	2,194	2.1%	25.1%	41.2%	32.3%	1.4%	1,791	3.1%	-0.9%
Total	**103,114**	**100.0%**	**22.6%**	**44.3%**	**31.8%**	**1.3%**	**58,444**	**100.0%**	

Table 3 – Descriptive statistics

Panels A and B of Table 3 present descriptive statistics for variables used in our analysis for the full and size-representative samples, respectively (both for the samples as a whole, and for firm-year observations within audit, review, compilation and company prepared verification levels within each sample). *CostOfDebt* has fewer observations than the reported sample sizes (*N*) because of data limitations (41,002 and 23,778 observations for the full sample and size-representative samples, respectively). Panel C of Table 3 presents size-representative sample correlations, with Pearson (Spearman) correlations reported above (below) the diagonal. Correlations that are significant at the 10% level or better are in bold. Variable definitions are presented in Appendix C.

Panel A: Full sample

	All Obs.		**Audit**		**Review**		**Compilation**		**Company**	
Variable	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
FSDScore	0.054	0.052	0.052	0.051	0.053	0.052	0.055	0.054	0.056	0.055
FScore	0.418	0.365	0.420	0.366	0.404	0.349	0.436	0.385	0.455	0.429
|AbAccruals|	0.099	0.069	0.096	0.064	0.099	0.070	0.101	0.071	0.117	0.082
AbAccruals	0.000	0.005	0.000	0.005	0.000	0.006	0.009	0.015	0.010	0.019
CostOfDebt	0.107	0.071	0.050	0.011	0.120	0.085	0.139	0.118	0.118	0.086
Assets	9.591	4.147	19.803	9.584	6.431	3.882	6.768	2.857	9.038	3.736
ROA	0.129	0.088	0.118	0.086	0.128	0.087	0.139	0.091	0.127	0.068
SalesGrowth	0.197	0.026	0.372	0.080	0.158	0.021	0.128	0.000	0.152	-0.049
SalesGrowthSq	0.612	0.068	0.846	0.078	0.505	0.055	0.588	0.086	0.740	0.184
Debt	3.471	1.577	6.326	3.737	2.668	1.430	2.540	1.153	4.034	1.896
Leverage	0.278	0.185	0.286	0.195	0.260	0.173	0.289	0.188	0.470	0.467
CurrRatio	2.404	1.608	2.215	1.529	2.302	1.595	2.675	1.706	2.530	1.517
CCorp	0.407	0.000	0.450	0.000	0.374	0.000	0.420	0.000	0.427	0.000
PPEta	0.621	0.461	0.584	0.437	0.628	0.469	0.641	0.471	0.536	0.338
NegEquity	0.078	0.000	0.081	0.000	0.065	0.000	0.091	0.000	0.131	0.000
IntCoverage	8.731	1.527	8.657	1.214	9.030	1.829	8.423	1.385	7.361	0.790
N	103,114		23,274		45,690		32,809		1,341	

Panel B: Size-representative sample

	All Obs.		**Audit**		**Review**		**Compilation**		**Company**	
Variable	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
FSDScore	0.053	0.052	0.053	0.051	0.053	0.052	0.055	0.054	0.056	0.054
FScore	0.426	0.375	0.416	0.361	0.411	0.357	0.459	0.412	0.479	0.450
|AbAccruals|	0.099	0.069	0.100	0.068	0.097	0.068	0.100	0.068	0.119	0.084
AbAccruals	0.005	0.010	0.002	0.007	0.002	0.007	0.011	0.016	0.017	0.023
CostOfDebt	0.104	0.078	0.073	0.049	0.108	0.082	0.120	0.092	0.104	0.085
Assets	5.369	4.751	6.128	5.786	5.325	4.702	4.907	4.220	5.330	4.714
ROA	0.134	0.089	0.121	0.085	0.134	0.090	0.142	0.093	0.140	0.070
SalesGrowth	0.217	0.042	0.251	0.045	0.205	0.043	0.215	0.040	0.243	0.022
SalesGrowthSq	0.579	0.062	0.635	0.071	0.518	0.051	0.636	0.079	0.812	0.188
Debt	2.433	1.882	2.787	2.117	2.363	1.856	2.274	1.782	3.083	2.427
Leverage	0.274	0.184	0.258	0.163	0.268	0.186	0.286	0.186	0.470	0.495
CurrRatio	2.321	1.576	2.278	1.575	2.199	1.550	2.560	1.639	2.432	1.500
CCorp	0.400	0.000	0.462	0.000	0.366	0.000	0.415	0.000	0.445	0.000
PPEta	0.612	0.448	0.611	0.456	0.612	0.452	0.617	0.441	0.520	0.331
NegEquity	0.073	0.000	0.093	0.000	0.062	0.000	0.077	0.000	0.109	0.000
IntCoverage	8.888	1.629	8.846	1.135	9.146	1.927	8.542	1.513	7.132	0.579
N	51,557		10,468		25,720		14,728		641	

Table 3, continued

Panel C: Size-representative sample correlations, with Pearson (Spearman) above (below) the diagonal

Variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*	*(17)*	*(18)*	*(19)*
Audit (1)		**-0.50**	**-0.32**	**-0.02**	**-0.02**	**-0.01**	**0.00**	**-0.20**	**0.17**	**-0.03**	**0.02**	**0.02**	**0.08**	**-0.03**	**-0.01**	**0.06**	0.00	**0.04**	**0.00**
Review (2)	**-0.50**		**-0.63**	**-0.04**	**-0.06**	**-0.02**	**-0.02**	**-0.06**	**-0.02**	0.00	**-0.02**	**-0.05**	**-0.03**	**-0.02**	**-0.06**	**-0.07**	0.00	**-0.04**	**0.02**
Compile(3)	**-0.32**	**-0.63**		**0.06**	**0.08**	**0.03**	**0.01**	**0.11**	**-0.13**	**0.03**	0.00	**0.03**	**-0.05**	**0.03**	**0.08**	**0.02**	**0.01**	0.01	**-0.02**
FSDScore (4)	**-0.03**	**-0.03**	**0.06**		**-0.03**	**-0.02**	**0.03**	**0.05**	**-0.01**	**0.07**	**0.02**	**0.03**	**-0.06**	**-0.15**	**0.07**	**-0.07**	**-0.09**	**-0.02**	**0.07**
FScore (5)	**-0.02**	**-0.07**	**0.09**	**-0.04**		**0.29**	**0.08**	0.01	**0.02**	**0.01**	**0.12**	**0.07**	**0.00**	**-0.02**	**-0.11**	**0.01**	**-0.45**	**-0.04**	**0.01**
AbAccruals (6)	**-0.01**	**-0.03**	**0.04**	**-0.02**	**0.27**		**-0.06**	**0.03**	**-0.01**	**-0.06**	0.01	**0.00**	**-0.05**	**0.02**	**0.10**	**0.07**	**-0.01**	**-0.06**	**-0.03**
|AbAccruals| (7)	**-0.01**	**-0.01**	**0.02**	**0.02**	**0.03**	**0.03**		**0.02**	**-0.05**	**0.18**	**0.04**	**0.04**	**0.02**	**0.06**	**0.01**	**-0.05**	**0.01**	**0.09**	**0.09**
CostOfDebt (8)	**-0.26**	**-0.08**	**0.15**	**0.04**	**0.02**	**0.04**	**0.04**		**-0.66**	**0.13**	**-0.08**	**-0.09**	**-0.69**	**-0.37**	**0.25**	**0.02**	**-0.05**	**-0.17**	**-0.05**
Assets (9)	**0.17**	**-0.01**	**-0.13**	**-0.02**	**0.02**	**-0.01**	**-0.06**	**-0.77**		**-0.02**	**0.14**	**0.10**	**0.50**	**0.04**	**-0.03**	**-0.02**	**-0.04**	**-0.04**	-0.01
ROA (10)	**-0.03**	**0.01**	**0.02**	**0.06**	**-0.04**	**-0.05**	**0.14**	**0.12**	**-0.01**		**0.13**	**0.06**	**-0.21**	**-0.14**	**0.19**	**-0.22**	**0.07**	**-0.18**	**0.48**
SalesGrowth (11)	**0.02**	0.00	**-0.02**	**0.02**	**0.14**	**0.01**	**0.04**	**-0.06**	**0.13**	**0.20**		**0.85**	**0.05**	**-0.04**	**-0.07**	**-0.01**	**-0.05**	**-0.02**	**0.07**
SalesGrowthSq (12)	**0.02**	**-0.06**	**0.04**	**0.04**	**0.08**	**0.01**	**0.09**	**-0.05**	**0.02**	**0.04**	**0.28**		**0.06**	**-0.01**	**-0.06**	**-0.01**	**-0.05**	**0.00**	**0.02**
Debt (13)	**0.06**	-0.01	**-0.05**	**-0.09**	**0.02**	**-0.04**	**-0.03**	**-0.88**	**0.49**	**-0.21**	**0.04**	**0.02**		**0.58**	**-0.33**	**-0.01**	**0.09**	**0.41**	**-0.27**
Leverage (14)	**-0.03**	0.00	0.01	**-0.19**	**-0.03**	**0.03**	0.00	**-0.35**	**0.04**	**-0.14**	**-0.04**	**0.00**	**0.62**		**-0.22**	**-0.02**	**0.29**	**0.38**	**-0.31**
CurrRatio (15)	**0.00**	**-0.03**	**0.04**	**0.06**	**-0.04**	**0.16**	0.00	**0.29**	**-0.04**	**0.25**	**-0.04**	**-0.05**	**-0.50**	**-0.31**		**-0.03**	**-0.06**	**-0.16**	**0.18**
CCorp (16)	**0.06**	**-0.07**	**0.02**	**-0.07**	**0.02**	**0.07**	**-0.05**	**0.02**	**-0.02**	**-0.23**	-0.01	**-0.01**	**-0.01**	**0.02**	**-0.01**		**0.01**	**-0.03**	**-0.14**
PPEta (17)	**-0.01**	**0.01**	0.00	**-0.10**	**-0.50**	**-0.01**	-0.01	**-0.03**	**-0.04**	**0.12**	**-0.02**	**-0.07**	**0.09**	**0.31**	**-0.08**	**0.02**		**0.08**	**-0.05**
NegEquity (18)	**0.04**	**-0.04**	**0.01**	**-0.02**	**-0.05**	**-0.05**	**0.07**	**-0.18**	**-0.04**	**-0.19**	**-0.04**	**0.01**	**0.30**	**0.29**	**-0.28**	**-0.03**	**0.05**		**-0.15**
IntCoverage (19)	**-0.03**	**0.04**	**-0.01**	**0.02**	**-0.01**	**-0.02**	**0.06**	**-0.04**	**0.00**	**0.62**	**0.13**	**0.02**	**-0.21**	**-0.18**	**0.19**	**-0.13**	**0.07**	**-0.20**	

Table 4 – Verification Service Levels and Financial Reporting Quality Proxies

Table 4 presents results using the size-representative sample of OLS estimation of Eq. (1) using four alternative FRQPs as the dependent variable, as well as a variant of Eq. (1) that uses propensity score weighting (PSW). *Review*, *Audit*, and *Compile* are indicator variables that equal one if a firm's annual financial statements received a review, audit, and compilation, respectively, and zero otherwise, which reflect effects relative to *Company* (i.e., company-prepared financial statements, which is the omitted category). All variables are further defined in Appendix C. Where indicated, industry and year fixed effects (including the intercept) are included but not reported. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors clustered by firm are reported below the associated coefficient estimates.

Dep. Var.:	*FSDScore*		*FScore*		*|AbAccruals|*		*AbAccruals*	
Method:	OLS	PSW	OLS	PSW	OLS	PSW	OLS	PSW
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Compile	-0.0021***	-0.0007	0.0157**	-0.0048	-0.0141***	-0.0146***	-0.0006	-0.0028
	0.0007	0.0013	0.0094	0.0155	0.0044	0.0050	0.0055	0.0094
Review	-0.0041***	-0.0028**	-0.0403***	-0.0647***	-0.0187***	-0.0199***	-0.0063	-0.0089
	0.0007	0.0013	0.0093	0.0154	0.0043	0.0050	0.0055	0.0093
Audit	-0.0045***	-0.0031***	-0.0398***	-0.0601***	-0.0167***	-0.0165***	-0.0078*	-0.0122*
	0.0007	0.0013	0.0096	0.0156	0.0044	0.0050	0.0056	0.0094
LnAssets	0.0000	-0.0003	0.0010	0.0021	-0.0099***	-0.0102***	-0.0020*	-0.0012
	0.0002	0.0004	0.0029	0.0033	0.0011	0.0012	0.0013	0.0017
SalesGrowthSq	0.0003***	0.0003***	0.0070***	0.0069***	0.0036***	0.0035***	0.0010**	0.0006
	0.0001	0.0001	0.0009	0.0010	0.0003	0.0004	0.0005	0.0005
Leverage	-0.0083***	-0.0080***	0.1375***	0.1371***	0.0254***	0.0264***	0.0299***	0.0266***
	0.0003	0.0005	0.0053	0.0058	0.0021	0.0024	0.0025	0.0032
CurrRatio	0.0003***	0.0002***	-0.0166***	-0.0167***	0.0008***	0.0008***	0.0068***	0.0067***
	0.0000	0.0001	0.0006	0.0007	0.0002	0.0003	0.0003	0.0004
CCorp	-0.0021***	-0.0021***	0.0065***	0.0052**	-0.0059***	-0.0066***	0.0163***	0.0162***
	0.0002	0.0002	0.0026	0.0029	0.0009	0.0010	0.0011	0.0013
PPEta	-0.0014***	-0.0017***	-0.2209***	-0.2222***	0.0003	0.0004	-0.0056***	-0.0057***
	0.0002	0.0003	0.0028	0.0030	0.0010	0.0011	0.0013	0.0015
NegEquity	0.0025***	0.0024***	-0.0582***	-0.0585***	0.0305***	0.0317***	-0.0323***	-0.0315***
	0.0003	0.0003	0.0047	0.0053	0.0022	0.0027	0.0026	0.0031
IntCoverage	0.0000*	0.0000*	0.0007***	0.0007***	0.0006***	0.0006***	-0.0003***	-0.0003***
	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0001
Fixed Effects	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y
N	51,557	51,557	51,557	51,557	51,557	51,557	51,557	51,557

R^2	4.46%	4.44%	26.06%	26.80%	4.97%	5.11%	2.41%	2.32%
F-tests:								
(*Compile-Review*)	144.06***	137.12***	238.45***	260.58***	21.22***	5.01**	27.05***	20.51**
(*Compile-Audit*)	150.69***	161.76***	231.17***	234.15***	6.30**	24.28***	36.90***	31.01***
(*Review-Audit*)	9.25***	3.11*	1.75	1.54	1.67	3.53*	1.72	1.19

Table 5 – Inventory Percentage Subsamples

Table 5 presents results of OLS estimation of Eq. (1) using the size-representative sample with four alternative FRQPs, separately for sample partitions based on the 75th percentile of inventory percentage (i.e., inventory-to-total-assets). *Review*, *Audit*, and *Compile* are indicator variables that equal one if a firm's annual financial statements received a review, audit, and compilation, respectively, and zero otherwise, which reflect effects relative to *Company* (i.e., company-prepared financial statements, which is the omitted category). All variables are further defined in Appendix C. Where indicated, industry and year fixed effects (including the intercept) are included but not reported. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors clustered by firm are reported below the associated coefficient estimates.

Inventory %:	Low-to-Mid range				High			
Dep. Var.:	*FSDScore*	*FScore*	|*AbAccruals*|	*AbAccruals*	*FSDScore*	*FScore*	|*AbAccruals*|	*AbAccruals*
Column:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Compile	-0.0019**	-0.0062	-0.0228***	-0.0040	-0.0020**	0.0701***	0.0086	0.0023
	0.0009	0.0124	0.0056	0.0073	0.0010	0.0140	0.0078	0.0062
Review	-0.0039***	-0.0595***	-0.0284***	-0.0067	-0.0038***	-0.0229**	-0.0036	-0.0019
	0.0009	0.0124	0.0056	0.0073	0.0010	0.0139	0.0078	0.0062
Audit	-0.0041***	-0.0505***	-0.0273***	-0.0074	-0.0059***	-0.0612***	-0.0082*	-0.0093*
	0.0009	0.0126	0.0057	0.0074	0.0010	0.0147	0.0061	0.0065
LnAssets	0.0000	-0.0050*	-0.0106***	-0.0029**	0.0000	0.0156***	0.0007	-0.0068***
	0.0002	0.0033	0.0012	0.0016	0.0004	0.0051	0.0021***	0.0019
SalesGrowthSq	0.0002***	0.0090***	0.0039***	0.0015***	0.0006***	0.0030**	-0.0002	0.0023***
	0.0001	0.0011	0.0004	0.0006	0.0001	0.0015	0.0008	0.0006
Leverage	-0.0084***	0.1138***	0.0217***	0.0231***	-0.0088***	0.1663***	0.0427***	0.0353***
	0.0004	0.0066	0.0026	0.0032	0.0006	0.0082	0.0040	0.0035
CurrRatio	0.0003***	-0.0175***	-0.0002	0.0066***	0.0000	-0.0119***	0.0072***	0.0041***
	0.0001	0.0007	0.0003	0.0004	0.0001	0.0012	0.0006	0.0005
CCorp	-0.0021***	0.0032	-0.0067***	0.0169***	-0.0023***	0.0154***	0.0148***	-0.0038**
	0.0002	0.0030	0.0011	0.0013	0.0003	0.0045	0.0018	0.0017
PPEta	-0.0013***	-0.1973***	-0.0016*	-0.0023*	-0.0022***	-0.2584***	0.0017	-0.0014
	0.0002	0.0030	0.0011	0.0015	0.0005	0.0090	0.0033	0.0027
NegEquity	0.0027***	-0.0557***	0.0278***	-0.0288***	0.0018***	-0.0595***	-0.0392***	0.0392***
	0.0004	0.0057	0.0026	0.0031	0.0006	0.0076	0.0045	0.0042
IntCoverage	0.0000	0.0007***	0.0006***	-0.0004***	0.0000	0.0011***	0.0002**	0.0005***
	0.0000	0.0001	0.0000	0.0001	0.0000	0.0002	0.0001	0.0001
Fixed Effects	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y	I,Y
N	38,667	38,667	38,667	38,667	12,890	12,890	12,890	12,890

R^2	4.41%	23.60%	4.11%	2.20%	5.42%	22.78%	4.54%	5.94%
F-tests:								
(*Compile-Review*)	99.16***	343.01***	23.69***	2.98*	31.28***	38.87***	19.54***	35.43***
(*Compile-Audit*)	103.90***	160.21***	10.64**	3.23*	34.09***	216.67***	44.87***	134.58***
(*Review-Audit*)	0.89	0.09	0.71	0.19	3.79*	20.61***	4.66**	2.94*

Table 6 – Verification Service Levels and Cost of Debt

Table 6 presents results using the size-representative sample of OLS estimation of Eq. (1) using *CostOfDebt* in year *t*+1 as the dependent variable, as well as a variant of Eq. (1) that uses propensity score weighting (PSW). *Review*, *Audit*, and *Compile* are indicator variables that equal one if a firm's annual financial statements received a review, audit, and compilation, respectively, and zero otherwise, which reflect effects relative to *Company* (i.e., company-prepared financial statements, which is the omitted category). All variables are further defined in Appendix C. Where indicated, industry and year fixed effects (including the intercept) are included but not reported. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors clustered by firm are reported below the associated coefficient estimates.

Method:	OLS	OLS	PSW
Dep. Var.:	*CostOfDebt*	*CostOfDebt*	*CostOfDebt*
Column:	(1)	(2)	(3)
Compile		-0.0021	-0.0049
		0.0044	0.0130
Review		-0.0083**	-0.0169*
		0.0044	0.0130
Audit	-0.0077***	-0.0136***	-0.0198*
	0.0010	0.0044	0.0131
LnAssets	-0.1308***	-0.1306***	-0.1310***
	0.0009	0.0009	0.0011
SalesGrowthSq	0.0000	-0.0001	-0.0002
	0.0002	0.0002	0.0004
Leverage	-0.0768***	-0.0770***	-0.0760***
	0.0017	0.0017	0.0021
CurrRatio	0.0092***	0.0091***	0.0091***
	0.0003	0.0003	0.0004
CCorp	0.0022***	0.0022***	0.0033***
	0.0008	0.0008	0.0010
PPEta	0.0045***	0.0046***	0.0045***
	0.0008	0.0008	0.0008
NegEquity	-0.0176***	-0.0176***	-0.0182***
	0.0013	0.0013	0.0014
IntCoverage	0.0008***	0.0008***	0.0008***
	0.0000	0.0000	0.0000
Fixed Effects	I,Y	I,Y	I,Y
N	23,778	23,778	23,778
R^2	68.58%	68.59%	67.91%
Difference in basis points			
Compilation – Review		0.0062	0.0120
Compilation – Audit		0.0115	0.0149
Review - Audit		0.0053	0.0028
(*Compile-Review*) F-test		72.88***	103.11***
(*Compile-Audit*) F-test		300.16***	137.12***
(*Review-Audit*) F-test		24.02***	10.58***

Table 7 – Implied Verification Service Fees

Panel A of Table 7 presents results of OLS estimation of Eq. (7) using confidential assurance fee data obtained from a Midwest regional accounting firm. *Compile*, *Review*, and *Audit* are indicator variables that equal one if a firm's annual financial statements received a compilation, review, and audit, respectively, and zero otherwise. All variables are further defined in Appendix C. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors are reported below the associated coefficient estimates. Panel B of Table 7 uses coefficient estimates presented in Panel A to compute average fees for verification levels, holding firm size at the sample mean.

Panel A: Regression results

Sample:	Full-Fee	Size-Representative Fee
Dep. Var.:	*AssurFees*	*AssurFees*
Column:	(1)	(2)
Compile	5,514***	3,126*
	551	2,076
Review	14,522***	13,651***
	1,022	1,926
Audit	23,584***	22,532***
	2,117	3,100
*Compile*Assets*	0.1334***	0.8646**
	0.0061	0.4905
*Review*Assets*	0.0043	0.2759
	0.0910	0.4312
*Audit*Assets*	0.2079**	0.7837
	0.0996	0.6591
N	424	179
R^2	65.40%	72.04%

Panel B: Economic magnitudes

Sample:	Full Fee			Size-Representative Fee		
Verification Level	Compile	Review	Audit	Compile	Review	Audit
Average cost based on mean assets	$6,417	$14,550	$27,702	$7,368	$15,120	$27,726
Percentage increase (Compile to Review)		127%			105%	
Percentage increase (Compile to Audit)		332%			276%	
Percentage increase (Review to Audit)		90%			83%	

Note: For both samples, the difference between a Review and Compilation as a percentage of the difference between an Audit and Compilation is 38%.

Panel C: Cost/benefit analysis

Verification difference	ΔBasis Points	ΔFees	ΔFees / ΔBasis Points
Full sample (n=424)			
Review - Compilation	0.0062	$8,133	$1,308,978
Audit - Review	0.0053	$13,152	$2,466,997
Size-representative sample (n=179)			
Review - Compilation	0.0062	$7,752	$1,247,719
Audit - Review	0.0053	$12,606	$2,364,569

Note: ΔBasis Points and ΔFees are from Table 6, column 2, and Table 7, panel B, respectively.

Table 8 – Changes in Verification Service Levels and Financial Reporting Quality Proxies

Panel A of Table 8 presents descriptive data on the frequency of firm-year observations in the size-representative sample that change verification levels year-over year, where 0 reflects no change in verification level, *+N* (*-N*) reflects increasing (decreasing) verification by *N* levels (e.g., "+1" indicates an increase from compilation to review or review to audit). Panel B of Table 8 presents results of OLS estimation of Eq. (8), where the change operator denotes annual change from year *t*–1 to *t*. *FSDScore* is a Benford's Law-based measure that is decreasing in financial reporting quality. |*AbAccruals*| are unsigned abnormal accruals from the modified Jones model. All variables are further defined in Appendix C. Industry and year fixed effects (including the intercept) are included but not reported. *, **, and *** indicate significance (two-sided) at the 10%, 5% and 1% levels, respectively, where standard errors clustered by firm are reported below the associated coefficient estimates.

Panel A: Descriptive change frequencies

	Firm-years with various levels of increase (+) or decrease (-) in verification in year *t* relative to *t*–1						
Verification Level in Year *t*–1	-3	-2	-1	0	+1	+2	+3
Company-Prepared				431	48	14	9
Compile			92	14,224	555	224	
Review		76	324	24,972	98		
Audit	42	132	179	10,137			
Total	42	208	595	49,764	701	238	9

Panel B: Regression output

Dep. Var.:	Δ*FSDScore*	Δ*FScore*	Δ|*AbAccruals*|	Δ*AbAccruals*
Column:	(1)	(2)	(3)	(4)
AssurDnAtoR	-0.0165	0.0603	-0.0602	0.1932
	0.0200	0.0591	0.2100	0.1858
AssurDnOther	0.0531***	0.0110	0.3088**	0.1689*
	0.0168	0.0525	0.1813	0.1183
AssurUpRtoA	-0.0358	-0.0610	0.1428	0.1187
	0.0384	0.1202	0.3402	0.3265
AssurUpOther	-0.0208*	-0.0536*	0.0175	-0.1270
	0.0129	0.0382	0.1322	0.1126
Δ*LnAssets*	0.0086	1.6417***	1.2678***	-0.1357**
	0.0087	0.0286	0.0882	0.0735
Δ*SalesGrowthSq*	-0.0113***	-0.0341***	-0.0708***	0.0646***
	0.0015	0.0049	0.0162	0.0134
Δ*Leverage*	-0.0088***	0.0397***	0.0276***	0.0342***
	0.0008	0.0027	0.0089	0.0073
Δ*CurrRatio*	0.0074***	-0.0181***	-0.0106	0.3331***
	0.0020	0.0068	0.0205	0.0172
Δ*CCorp*	-0.0417***	0.0766***	-0.1431***	0.2306***
	0.0040	0.0142	0.0433	0.0358
Δ*PPEta*	-0.0116***	-0.1965***	0.0031	-0.0305***
	0.0012	0.0034	0.0130	0.0109
Δ*NegEquity*	0.0079*	-0.0555***	0.6146***	-0.1601***
	0.0061	0.0207	0.0648	0.0535
Δ*IntCoverage*	0.0020***	-0.0020*	0.0176***	-0.0009
	0.0004	0.0012	0.0046	0.0038
Fixed Effects	I,Y	I,Y	I,Y	I,Y
N	51,557	51,557	51,557	51,557
R^2	1.03%	12.92%	0.91%	0.97%